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Evaluating Long-Term Effects of Heroin-Assisted Treatment: The Results of a 6-Year Follow-Up

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Addiction · Treatment · Heroin prescription · Follow-up · Switzerland

Abstract
Since January 1994, heroin-assisted treatment for opiate addicts has been available in Switzerland. This is the first report of the long-term effects of this form of treatment. The report examines subjects who entered a study involving medical prescription of opiates (Projekt zur ärztlichen Verschreibung von Betäubungsmitteln; PROVE) in Switzerland between January 1994 and March 1995 (n = 366). Opiates were dispensed in eight treatment centres. A follow-up was conducted 6 years after treatment entry. Two groups were assessed: clients who have continuously been on heroin-assisted treatment since entry into the PROVE study or who re-entered this treatment, and ex-clients who had discontinued heroin-assisted treatment at the time of follow-up. Two kinds of comparisons were conducted. Firstly, conditions at treatment entry were compared to 6-year follow-up outcomes, and secondly, outcomes were compared between clients still on heroin-assisted treatment and those who had been discharged. It was found that 46% of the clients still alive were on heroin-assisted treatment at the time of follow-up. A comparison of the present living conditions showed very little difference between those in treatment and those who had terminated treatment. Compared to the situation at entry, the results of the follow-up showed a significant decrease in the use of illegal substances, illegal income and most other variables concerning social conditions, but they also showed an increase in unemployment and reliance on social benefits. Heroin-assisted treatment is thus efficacious in the long-term course of treatment and is still effective after termination of treatment with respect to living conditions and use of illicit substances.

Introduction

Heroin-assisted treatment for opioid addicts began in Switzerland in 1994 with a research program called the Medical Prescription of Narcotics, or PROVE (acronym of German version: Projekt zur ärztlichen Verschreibung von Betäubungsmitteln) [1]. Even though the introduction of this program was initially controversial [2, 3], it is now an accepted therapeutic option among the wide variety of drug therapy programs in Switzerland [4]. The treatment goal was to reach long-term opioid addicts who so far could not be integrated into other treatment programs with an ambulant treatment program. It is assumed that

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once the clients start a treatment program, other problems, such as health and social rehabilitation, will improve. The main objective in the long run is abstinence [5].

A central question in every substitution treatment program concerns the long-term consequences of treatment with respect to successful rehabilitation. So far, the research results of PROVE have shown improvement of the clients' social rehabilitation over the short- and mid-term course of their treatment [1]. Six-, 12- and 18-month follow-up assessment of clients who had stayed in treatment for at least 18 months showed that the proportion of (almost) daily consumers of illegal heroin decreased from 81 to 6% during this time period, and the proportion of almost daily cocaine users decreased from 29 to 5%. With respect to changes in social integration, homelessness almost disappeared within the first 18 months of heroin-assisted treatment, and a marked improvement was seen in reintegration into the labour market [1].

While these success rates are impressive, comparisons of these with other substitution treatment, especially methadone maintenance treatment, are difficult, as these programs are geared towards other clientele rather than heroin-assisted treatment clients [6]. Thus, the eligibility requirements to enter heroin-assisted treatment are for more severely affected opioid addicts, compared to the usual criteria to enter methadone maintenance treatment. One of the criteria was failure in at least two methadone maintenance treatment or other treatment programs (see below for details).

Research studies have not yet analysed the question of how heroin-assisted treatment influences the long-term living conditions of clients and former clients. Important indications of how to optimise present/future treatment programs can be expected by studying the course of treatment and outcomes in the long term.

This article provides an overview with respect to risk behaviour and the social situation of clients about 6 years after they first entered a heroin-assisted treatment program. Central issues were the degree of social reintegration or adjustment and the level of use of illegal and non-prescribed substances. The study compared clients who were either still participants in heroin-assisted treatment programs or had re-started heroin-assisted treatment with clients who had terminated treatment.

Subjects and Methods

In the 6-year follow-up of the first cohort, those clients were re-examined who had entered heroin-assisted treatment between January 1994 and March 1995, independently of their current treatment status. The eligibility criteria for entering heroin-assisted treatment were a minimum age of 20 years, at least 2 years of severe heroin addiction, at least two failed efforts on an acknowledged in-patient or out-patient treatment program and marked deficits in somatic or mental health or social integration caused by drug abuse. The sample consisted of 366 persons. At the time of follow-up, 148 were in heroin-assisted treatment, 175 were no longer in this treatment and 43 had died. No sample-specific data on dosage were available for the analysis. General data on dosage in the Swiss heroin-assisted treatment program can be found in Uchtenhagen et al. [1].

Professional personnel conducted the follow-up interview using standardized questionnaires. A detailed questionnaire based on the EuropASI was developed for clients still in treatment and for persons who had terminated treatment. Questions were asked about living conditions, health, treatment, opioid use and risk behaviour. Care was taken to ensure the compatibility of the newly assessed data with earlier follow-ups.

Clients were contacted directly through the treatment centres to meet the requirements of data protection. Those persons who had terminated treatment were contacted directly by the interviewer or through the treatment centres. The interview took place on average 6.3 years (SD 0.3 years) after first entry into heroin-assisted treatment. The mean cumulative length of stay in heroin-assisted treatment was 6.1 years for those still or again in treatment (SD 0.7 years). The length of stay in heroin treatment of those discharged from treatment was 2.4 years (SD 1.8 years).

Quantitative data analysis was conducted using SPSS 6.1 for Macintosh. Patient data were used to calculate the length of stay in heroin-assisted treatment, as well as the number of entries and discharges. Comparisons of different groups at the same measurement point were conducted using χ^2 and t tests, whereas comparisons between different measurement points were done using the χ^2 test and McNemar test for categorical variables and the Friedman test for ordinal variables. The level of significance was fixed at $p < 0.01$.

Results

Tracking Rate and Response Rate

By the end of 2000, 43 of the 366 (11.7%) clients who were included in this re-examination had died. Of those 43 clients, 5 clients were in a heroin-assisted treatment program at the time of death. Seven persons died within 1 week after discharge from a treatment program, and the remaining 31 persons died more than 1 week after termination of treatment. Mortality and underlying causes of death will be analysed in a separate study.

Of those clients who were still alive, 148 were still or again in heroin-assisted treatment, whereas 175 had left this treatment in the evaluation period without re-entering. For this study, 132 of 148 (89.2%) clients in treatment programs and 112 of 175 (64.0%) persons who had terminated treatment were examined. The net response rate after subtraction of the neutral losses to follow-up amounted to 82.7%.

Table 1. Daily illegal use of substances at entry and at the 6-year evaluation: comparison of clients still in treatment and persons who had terminated treatment

Daily or near daily illegal use	Clients still in treatment (n = 132)		Persons who had terminated treatment (n = 112)		Significance tests
	entry	after 6 years	entry	after 6 years	
Heroin	84.7	3.8	76.1	18.9	(md = 2) $\chi^2 = 14.3$; df = 1; $p < 0.001$
	(md = 2) McNemar = 101.1; $p < 0.001$		(md = 4) McNemar = 50.3; $p < 0.001$		
Cocaine	27.5	5.3	30.8	9.8	(md = 0) $\chi^2 = 1.8$; df = 1; n.s.
	(md = 1) McNemar = 22.4; $p < 0.001$		(md = 5) McNemar = 13.8; $p < 0.001$		
Benzodiazepine	18.8	4.5	16.3	3.6	(md = 2) $\chi^2 = 0.1$; df = 1; n.s.
	(md = 4) McNemar (binominal); $p < 0.001$		(md = 10) McNemar (binominal); $p < 0.01$		
Cannabis	30.5	34.4	33.3	35.7	(md = 1) $\chi^2 = 0.0$; df = 1; n.s.
	(md = 5) McNemar = 0.4; n.s.		(md = 4) McNemar = 0.2; n.s.		

Values are shown as percentages. The final column on the right shows significance values for comparisons of clients still in treatment and persons who had terminated treatment at the 6-year evaluation. md = Missing data; n.s. = not significant.

Of the 132 clients in heroin-assisted treatment at the time of follow-up, 110 (83.3%) had stayed in this treatment for the whole time period, 20 (15.2%) had been discharged and re-entered once and 2 clients had been discharged and re-entered twice. 96 of the 112 (85.7 %) persons who had terminated treatment had one treatment episode, 11 (9.8%) had two episodes and 5 (4.5%) had three episodes in heroin-assisted treatment programs.

At follow-up, it was not assessed how many subjects were in another substitution treatment. However, the reasons for the last discharges were assessed. About one third (30.6%) reported reasons for discharge connected to problems with adherence to the treatment protocol. Reasons for 'positive' terminations were mainly the beginning of an abstinence-oriented therapy (24.3%) or transfer into methadone substitution treatment (21.6%).

Socio-Demographic Characteristics

With respect to the evaluation of living conditions, no significant differences were found among clients and persons who had terminated heroin-assisted treatment. There were also no significant differences in sex ratios between those still in treatment and discharged clients. In both groups, the biggest segment was found in the age range of 31–35 years. The average age was around 36 years for clients still in treatment as well as for persons who had terminated treatment. This was true for both male and female clients. A significant difference was the fact that persons who had terminated treatment were remarkably more often married.

Use of Substances

Table 1 shows data on the illegal use of substances in the groups of clients and persons who had terminated treatment. All data reported here are based on self-reports and were not validated by urinalysis. Since their entry into PROVE 6 years before, the daily use of non-prescribed heroin, benzodiazepines and cocaine significantly decreased in both groups, i.e. those still in treatment and discharged clients. In contrast, the use of cannabis showed only minor changes. About 6 years after their first entry, 18 (16%) of the examined former PROVE clients were abstinent of opioids and cocaine. They reported being 'clean' and having consumed neither cocaine, heroin, methadone nor other opioids within the last 6 months;

Table 2. Living situation at entry and at the 6-year re-evaluation: comparison of clients still in treatment and persons who had terminated treatment

Variables	Clients still in treatment (n = 132)		Persons who had terminated treatment (n = 112)		Significance tests
	entry	after 6 years	entry	after 6 years	
Homelessness	9.8	1.5	8.0	0.9	(md = 0) Fisher's exact test: n.s.
	(md = 0) McNemar (binominal); n.s.		(md = 0) McNemar (binominal); n.s.		
Unemployment	31.1	34.1	29.5	33.9	(md = 0) $\chi^2 = 0.0$; df = 1; n.s.
	(md = 0) McNemar = 0.2; n.s.		(md = 0) McNemar = 0.3; n.s.		
Mostly illegal income	53.0	9.8	42.2	11.6	(md = 0) $\chi^2 = 0.2$; df = 1; n.s.
	(md = 1) McNemar = 35.6; $p < 0.001$		(md = 1) McNemar = 48.6; $p < 0.001$		
Dependence on social benefits	19.1	39.7	23.4	31.5	(md = 0) $\chi^2 = 1.8$; df = 1; n.s.
	(md = 1) McNemar = 12.3; $p < 0.001$		(md = 1) McNemar = 1.8; n.s.		
Debt					
Debt free	24.4	48.0	29.9	36.4	(md = 6)
<CHF 5,000[1]	21.3	11.8	22.4	22.4	$\chi^2 = 9.0$; df = 3; n.s.
CHF 5,000–30,000[2]	38.6	29.9	28.0	24.3	
>CHF 30,000[3]	15.7	10.2	19.6	16.8	
	(md = 5) Friedman $\chi^2 = 7.6$; df = 1; n.s.		(md = 4) Friedman $\chi^2 = 0.6$; df = 1; n.s.		
Pending court case	31.6	9.4	28.3	14.2	(md = 3) $\chi^2 = 1.1$; df = 1; n.s.
	(md = 15) McNemar = 16.4; $p < 0.001$		(md = 6) McNemar = 5.3; n.s.		

Values are shown as percentages. The final column on the right shows significance values for comparisons of clients still in treatment and persons who had terminated treatment at the 6-year evaluation. md = Missing data; n.s. = not significant.

[1] Equivalent to <EUR 3,333.

[2] Equivalent to EUR 3,333–20,000.

[3] Equivalent to >EUR 20,000.

they also reported not being participants in methadone substitution programs (not shown in table 1).

The proportion of those clients who were currently in a heroin-assisted treatment program and additionally consumed illegal heroin on a daily or almost daily basis 6 years after their first entry was 3.8%, which is highly significantly lower than the rate in people who had terminated treatment (18.9%). However, the percentage of clients still in treatment with daily or almost daily use of benzodiazepines and cocaine was about the same as in the group of persons who had terminated treatment.

Living Conditions

Table 2 shows the comparison of living conditions at entry and after 6 years. Two clients still in treatment (1.5%) and one person who had terminated treatment (0.9%) were mainly homeless within the last 6 months before the evaluation. Unemployment showed a slight increase (in clients still in treatment, it went from 31.1 to 34.1%; in persons who had terminated treatment, it went from 29.5 to 33.9%).

Whereas at entry, about one half of the examined persons reported having illegal income for subsistence, only

Table 3. Social contacts at entry and at the 6-year evaluation: comparison of clients still in treatment and persons who had terminated treatment

Variables	Clients still in treatment (n = 132)		Persons who had terminated treatment (n = 112)		Significance tests
	entry	after 6 years	entry	after 6 years	
No close friends at all	26.5	21.2	24.3	26.1	(md = 0) $\chi^2 = 0.7$; df = 1; n.s.
	(md = 0) McNemar = 1.0; n.s.		(md = 1) McNemar = 0.0; n.s.		
Contact with drug-free friends					
Rare or never	43.7	39.7	37.7	37.7	(md = 4)
Once/numerous/monthly	30.2	34.1	38.7	33.0	$\chi^2 = 0.2$; df = 2; n.s.
Numerous weekly	26.2	26.2	23.6	29.2	
	(md = 6) Friedman $\chi^2 = 0.1$; df = 1; n.s.		(md = 6) Friedman $\chi^2 = 0.2$; df = 1; n.s.		
Contact with formerly addicted friends					
Rare or never	79.2	75.8	70.3	68.3	(md = 3)
Once/numerous monthly	13.3	18.3	20.8	24.8	$\chi^2 = 2.3$; df = 2; n.s.
Numerous weekly	7.5	5.8	8.9	6.9	
	(md = 12) Friedman $\chi^2 = 0.0$; df = 1; n.s.		(md = 11) Friedman $\chi^2 = 0.2$; df = 1; n.s.		
Contact with currently addicted friends					
Rare or never	42.4	60.8	38.3	64.5	(md = 3)
Once/numerous monthly	20.8	14.4	27.1	16.8	$\chi^2 = 1.3$; df = 2; n.s.
Numerous weekly	36.8	24.8	34.6	18.7	
	(md = 7) Friedman $\chi^2 = 5.4$; df = 1; n.s.		(md = 4) Friedman $\chi^2 = 8.3$; df = 1; n.s.		

Values are shown as percentages. The final column on the right shows significance values for comparisons of clients still in treatment and persons who had terminated treatment at the 6-year evaluation. md = Missing data; n.s. = not significant.

10% reported such an income at the time of follow-up. In contrast, the percentage of people who were dependent on social benefits had significantly increased in the group of clients still in treatment compared to the entry data. However, with a percentage of 39.7%, the number of clients still in treatment who received social benefits was not significantly greater than in those who had terminated treatment (31.5%).

With respect to debt, only the group of clients still in treatment showed a decrease; however, overall, the percentage of debt-free people had almost doubled.

With respect to pending court cases, a significant reduction had occurred since 1994/1995 in the group of clients still in treatment as well as in the group of persons who had terminated treatment.

Partnership and Children

The data showed that persons who had terminated treatment more often lived in a stable partnership, but only 11.5% of the clients still in treatment and 15.6% of the persons who had terminated treatment lived in a partnership with an addicted person. There was also a tendency for these people to live alone, especially in the group of clients still in treatment. Since entry, the percentage of people who live with children increased in both groups.

Social Contacts

With respect to social integration, it is beneficial that persons live at a distance from the drug scene and that new relationships are established outside the drug scene. Therefore, table 3 attempts to differentiate between contact with drug-addicted and drug-free persons. Both in clients still in treatment and discharged clients, nearly the same proportion at entry as at the 6-year follow-up reported having no close friends at all (20–27%). All in all, contact with addicted persons had decreased. More than one half of all persons had no or rare contact with addicted persons within the last 6 months before the inter-

view. Regarding contact with former addicted friends and persons who had never been addicted, the differences between the time of entry and after the course of treatment were very slight.

Discussion

This study compared two elements: (1) the situation of clients at their first entry into heroin-assisted treatment and 6 years later, and (2) clients who were still in heroin-assisted treatment programs and discharged clients. The focus was placed on a drug-political and therapeutic goal to improve social integration of clients [7]. Although all data reported here are based on self-reports, we assume that their validity is high, as the interviews were carried out by specially trained interviewers and confidentiality of all data was insured.

In addition, in prior studies with similar questionnaires and the same interview staff, we had found high convergence between self-reports and objective measures for drug use and criminal behaviour [8, 9].

Compared to other studies with a similar follow-up period [10–12], where the tracking rates were between 36 and 80%, the tracking rate of our study was very high, with almost 83% of subjects being reached for follow-up. The analyses showed that 45.8% of the former cohort were again or still in heroin-assisted treatment, and that about one half of the persons who had terminated treatment re-started a treatment program. The results also showed that a great number of clients could be motivated to undergo further treatment. However, examination of the data evaluated for this study did not allow us to give more details concerning reasons for the change from a costly heroin-assisted treatment to a less costly methadone substitution treatment program.

The study showed that the positive changes which could be achieved in the mid-term and long-term course of treatment persisted even if treatment had been terminated. This was also confirmed by a comparison of clients still in treatment and persons who had terminated treatment. In fact, there was very little difference between the two groups with respect to their living situations 6 years after they first entered treatment.

Persons who had terminated treatment only showed more problematic outcomes with respect to debt. The question therefore arises as to why more clients still in treatment were able to reduce their debt? A major reason for this reduction is likely to be the great effort most agencies devote to debt counselling and administration of their clients' finances. An alternative explanation could be the lower costs for clients to finance substance dependency compared to persons who had terminated treatment. However, it has to be mentioned that about 40% of all persons had debts of over CHF 5,000 (EUR 3,333).

The study also showed a positive tendency with respect to delinquency. Based on self-reports, a significantly lower percentage of clients still in treatment had an illegal source of income to finance their lives. At entry into treatment, about one half of the examined persons earned their living at least partly from prostitution or delinquent behaviour. We assume that the reduction in illegal activities is connected with the reduced need for money to purchase drugs.

With respect to social integration, a decrease in contact with addicted friends and colleagues has to be mentioned. Overall, about one fourth of all examined persons reported not having any close friends. The reduction of social contacts corresponded in many cases with their separation from the drug scene, but the dropped contacts could not be replaced. Thus, clients have a double fringe group identity: they are drug addicts living within society, but also receivers of heroin, albeit living away from the drug scene [13].

Surprisingly, the results show a minor increase in unemployed persons compared to the data from the short-term and mid-term course of treatment [1]. It is possible that clients were more flexible at the beginning of heroin-assisted treatment with respect to finding and starting a new job, whereas today they are probably more demanding. On the other hand, it has to be assumed that today employers are less enthusiastic about giving jobs to persons who are in heroin-assisted treatment. A vast majority of the examined people had only limited social and health resources. A further reason for the high rates of unemployment could be the very structured and time-intensive nature of the heroin prescription program. On average, clients get their pharmaceutical dose 2–3 times a day, which may make pursuing a regular occupational activity quite difficult. Given these circumstances, a complete reintegration into the workforce is extremely difficult and can probably not be achieved for those people [14]. As a consequence, we suggest the development of specific measures for rehabilitation for this group of patients.

An important effect of the lack of reintegration into the workforce is the dependence on social benefits. The fact that the percentages of people who received social benefits doubled in the group of clients still on treatment is probably connected with the abandonment of illegal sources of income in favour of social benefits. In the group of per-

sons who had terminated treatment, this tendency was less marked, probably because they less frequently meet the requirements for receiving social benefits.

Furthermore, the study showed that the reduction of illegal consumption of heroin, cocaine and benzodiazepines, which was evident only after a treatment period of 6 months, was also evident in the long-term course of treatment. At the time of this study, the examined persons from both groups reported that they consumed significantly less heroin, benzodiazepines and cocaine on-site. It is likely that the reason for reduction in use in the group of people who had terminated heroin-assisted treatment is due to the fact that the vast majority was still on other drug-specific treatment. Despite the overall reduction in drug use on-site, there was still a considerable level of illegal drug consumption. Reducing this level will be one of the future tasks in this area.

Conclusions

The results of this study showed that 6 years after first entry into a heroin-assisted treatment program, the real living situation was more or less similar in the group of clients still in treatment and the group of persons who had terminated treatment.

Other research studies in which the short-term and mid-term course of treatment have been analysed showed that in some areas, e.g. living situation, the integration of clients was possible in a relatively short time period [1]. The current study showed that the achieved integration can be permanent. As the data from the long-term course of treatment indicate, a continued improvement in other areas of integration is much more difficult. On the one hand, consolidation of the situation appears possible, but on the other hand, it seems improbable; specifically, in the three major areas of work, financial situation and social contacts, no improvements could be achieved.

If it is assumed that employment improves the financial situation, has positive effects on social contacts and on detachment from the drug scene, structures the day and improves self-confidence, then more emphasis needs to be placed on reintegration into the workforce.

With respect to substance use, the results showed that heroin-assisted treatment is effective even over a time period of 6 years. Since entry into treatment 6 years before, the illegal on-site use of heroin, cocaine and benzodiazepines was significantly reduced in the group of clients as well as in the group of people who had terminated treatment. The conservative estimation of the percentage of ex-clients (n = 175) who were abstinent of opioids at the time of follow-up was 10%. This estimate is based on the assumption that the clients we could not reach in follow-up were not abstaining.

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